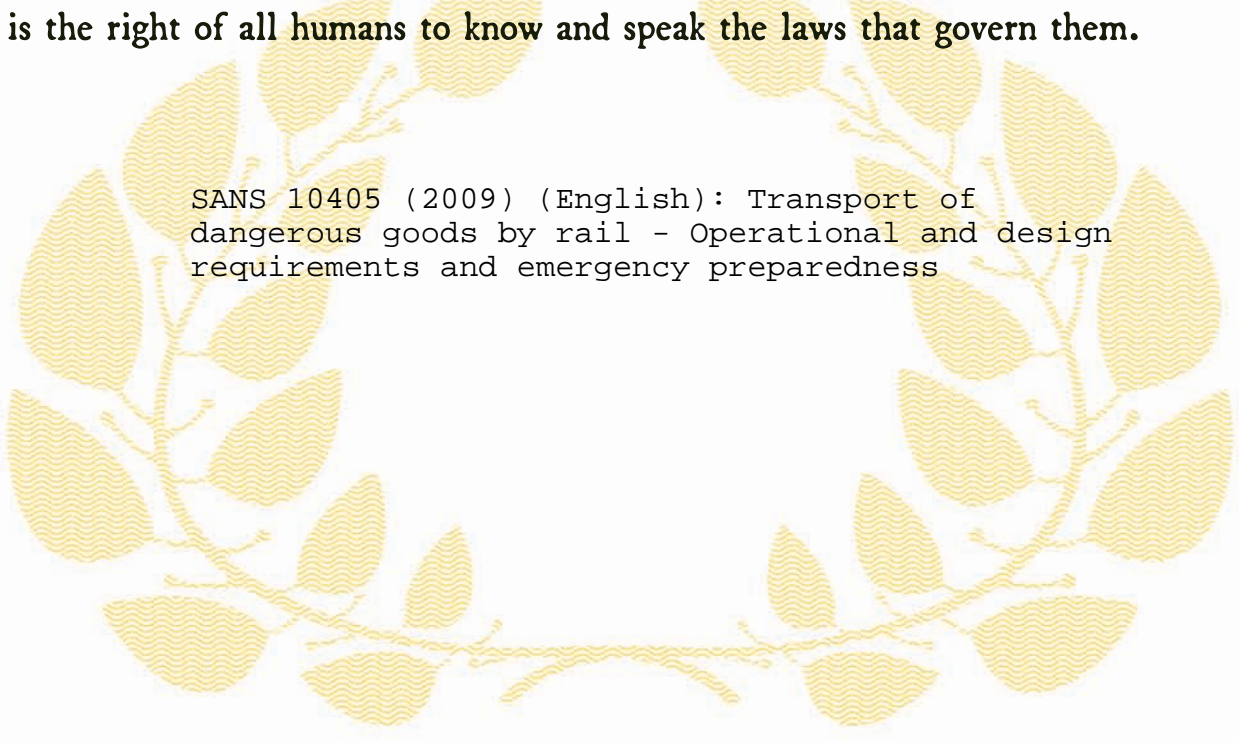




Republic of South Africa

EDICT OF GOVERNMENT

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SANS 10405 (2009) (English): Transport of
dangerous goods by rail - Operational and design
requirements and emergency preparedness



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SANS 10405:2009

Edition 1

SOUTH AFRICAN NATIONAL STANDARD

**Transport of dangerous goods by rail —
Operational and design requirements and
emergency preparedness**

SANS 10405:2009

Edition 1

Table of changes

Change No.	Date	Scope

Acknowledgement

The SABS Standards Division wishes to acknowledge the valuable assistance derived from the publication, *Regulations concerning the international carriage of dangerous goods by rail* (RID), published by the European Union.

Foreword

This South African standard was approved by National Committee SABS SC 1060B *National committee for dangerous goods standards – Classification and information*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in May 2009.

Reference is made in **3.1.1** to the “relevant national legislation”. In South Africa this means the National Railway Safety Regulator Act, 2002 (Act No. 16 of 2002).

Reference is made in **4.3.2(b)**, **4.3.2(n)(6)**, **5.1.1**, **5.1.2.1.2** and **5.2.1** to the “relevant national legislation”. In South Africa this means the Occupational Health and Safety Act, 1993 (Act No. 85 of 1993).

Reference is made in **4.3.6.2(c)**, **4.4(d)(3)** and **5.2.2** to the “relevant national legislation”. In South Africa this means the Explosives Act, 2003 (Act No. 15 of 2003).

Annexes A and D form an integral part of this document. Annexes B and C are for information only.

Contents

	Page
Foreword	
1 Scope	3
2 Normative references	3
3 Definitions and abbreviations	4
4 Responsibilities of the consignor, train operator and consignee	6
4.1 General	6
4.2 Training	7
4.3 Consignor responsibilities	8
4.3.1 Classification and packaging	8
4.3.2 Requirements for loading	8
4.3.3 Waste classification confirmation	9
4.3.4 Precautions with respect to food products, for human consumption and animal feeds	9
4.3.5 Loading of gas cylinders	9
4.3.6 Documentation	10
4.3.7 Placarding	11
4.4 The train operator	13
4.5 Consignee	14
5 Design requirements, security and exemptions	15
5.1 Design requirements	15
5.2 Security	16
5.3 Exemptions	17
Annex A (normative) General provisions and load compatibility chart for dangerous goods .	18
Annex B (informative) Consignment note and wagon label	21
Annex C (informative) Vehicle list	22
Annex D (normative) Fumigation warning signs	23
Bibliography	24

SANSSANS 10405:2009

Edition 1

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Transport of dangerous goods by rail — Operational and design requirements and emergency preparedness

1 Scope

This standard specifies the requirements for the safe transport of dangerous goods by rail in terms of:

- a) operational requirements;
- b) design requirements; and
- c) emergency preparedness.

This includes documentation, loading, dispatch, placarding, contingency planning and occurrence management, offloading, security issues and training.

2 Normative references

The following referenced documents are indispensable for the application of this document. For undated references, the latest edition of the referenced document (including any amendments) applies. Information on currently valid national and international standards can be obtained from the SABS Standards Division.

SANS 3000-1, *Railway safety management – Part 1: General*.

SANS 3000-2-1, *Railway safety management – Part 2-1: Technical requirements for engineering and operational standards – General*.

SANS 3000-2-3, *Railway safety management – Part 2-3: Technical requirements for engineering and operational standards – Rolling stock*.

SANS 10228, *The identification and classification of dangerous goods for transport*.

SANS 10229-1, *Transport of dangerous goods – Packaging and large packaging for road and rail transport – Part 1: Packaging*.

SANS 10229-2, *Transport of dangerous goods – Packaging and large packaging for road and rail transport – Part 2: Large packaging*.

SANS 10231, *Transport of dangerous goods – Operational requirements for road vehicles*.

SANS 10232-1, *Transport of dangerous goods – Emergency information systems – Part 1: Emergency information system for road transport*.

SANS 10232-3, Transport of dangerous goods – Emergency information systems – Part 3: Emergency response guides.

SANS 10233, Transport of dangerous goods – Intermediate bulk containers for road and rail transport.

SANS 10263-2, Warehousing of dangerous goods – Part 2: The storage and handling of gas cylinders.

3 Definitions and abbreviations

3.1 Definitions

For the purpose of this document, the following definitions apply.

3.1.1

approved inspection authority

body legally responsible for the relevant national legislation (see foreword)

3.1.2

competent authority

national body or authority, designated, or otherwise recognized for the control or regulation of a particular aspect of the transport of dangerous goods

3.1.3

consignee

person who has been designated to receive dangerous goods that have been transported

NOTE If the consignee designates a third party in accordance with the provisions applicable to the contract for transport, this person is deemed to be the consignee. If the transport operation takes place without a contract for transport, the person who takes ownership of the dangerous goods on arrival is deemed to be the consignee.

3.1.4

consignment

package or packages or load of dangerous goods presented by a consignor for transport

3.1.5

consignment note and wagon label

document containing information in terms of the contract for transport on any package or packages, or load of dangerous goods presented by a consignor for transport by rail

3.1.6

consignor

person who offers dangerous goods for transport, including the product manufacturer, product owner or an agent appointed as such

3.1.7

container

freight container, IBC, portable tank and bulk container

3.1.8

portable tank

multimodal tank used for the transport of dangerous goods of class 1 and classes 3 to 9, comprising a shell fitted with service equipment and structural equipment necessary for the transport of dangerous goods and capable of being filled and discharged without removal of the structural equipment

3.1.9

receptacle

means of a containment vessel used for receiving and holding dangerous goods which is fitted with a means of closure

3.1.10

segregation

loading of compatible products of different classes or divisions as specified in SANS 10228 in separate areas within wagons, freight containers or multi compartment tanks and pressure vessels

3.1.11

serviceworthy

rolling stock that is technically sound, with or without prescribed conditions or restrictions

NOTE Any conditions or restrictions imposed on one vehicle in a consist for whatever reason, apply to the whole consist. Vehicle loads should conform to loading specifications.

3.1.12

tank

tank-container, portable tank, tank-wagon, and demountable tank, including its service and structural equipment

3.1.13

tank-container

article of transport equipment, with a capacity of more than 450 L, meeting the definition of a container and comprising a shell and items of equipment, including the equipment to facilitate movement and handling used for the transport of gases, liquid, powdery or granular substances

3.1.14

tank-wagon

wagon intended for the transport of liquids, gases, powdery or granular substances, which operates either at atmospheric pressure or elevated pressure, comprising a superstructure, consisting of one or more shells and an under-frame fitted with its own items of equipment including running gear, suspension, buffing, traction, braking gear and inscriptions

NOTE Tank-wagon also includes wagons with demountable tanks.

3.1.15

United Nations number

UN No.

serial number assigned to dangerous goods by the United Nations Committee of Experts on the transport of dangerous goods

3.1.16

vehicle list

document containing information relating to the wagons and load on a train

SANS 10405:2009

Edition 1

3.1.17

wagon

rail vehicle without its own means of propulsion and includes flatbed wagon, open wagon, closed wagon, tank wagon, and multi-compartment tank wagon

3.1.18

waste

substances, solutions, mixtures or articles for which no direct use is envisaged but that are carried for reprocessing, dumping, elimination by incineration or other methods of disposal

3.2 Abbreviations

3.2.1

AAR

Association for American Railroads

3.2.2

AIA

Approved Inspection Authority

3.2.3

IBC

intermediate bulk container

3.2.4

ICAO Technical Instructions

International Civil Aviation Organisation technical Instructions for the safe transport of dangerous goods by air

3.2.5

ISO

International Organization for Standardization

3.2.6

RID

Regulations Concerning the International Carriage of Dangerous Goods by Rail

3.2.7

UIC

International Union of Railways

4 Responsibilities of the consignor, train operator and consignee

4.1 General

4.1.1 The consignor, train operator and consignee involved with the transport of dangerous goods by rail shall take appropriate measures according to the nature and the extent of foreseeable risk, in order to avoid and mitigate the potential damage that may arise from such transport, or minimize the damage to property and the environment or injury to people. The consignor, train operator and consignee shall, in all respects, comply with the requirements of this standard within their respective areas of responsibility.

4.1.2 When there is an immediate threat that could jeopardize public safety, parties involved shall take the necessary steps to avoid, minimize and mitigate such a threat, including the immediate notification of the emergency services and by making available to them any information

including documentation as given in 4.4(c) and 4.4(f) which they may require in order to take appropriate action.

4.1.3 Damaged, leaking or contaminated packages, the following shall apply:

- a) Dangerous goods shall not be offered or accepted for transport or continued to be transported if it is evident that a package is damaged or leaking or if it is suspected that a package may have leaked or been damaged.
- b) Access to the package shall be restricted until the extent of the risk to health, environment, property and the wagon has been assessed. The scope of the risk assessment shall include:
 - examination of the package, and
 - examination of the loading areas and adjacent vicinity.

If the dangerous goods are already on the wagon or container, the assessment shall also include other wagons and containers on the train;

- c) In the event that a damaged or leaking package is observed during the offloading operation, the assessment shall also include the offloading facilities, area and adjacent areas.
- d) The loading, transport and or offloading activity may only proceed once appropriate measures have been put in place to avoid, mitigate such risk and that the package is safe to be handled or transported.
- e) Where the consignment cannot be loaded, transported or offloaded the damaged, leaking or contaminated wagon or container shall be stored or staged, as the case may be, in a safe location until the hazards have been mitigated and the dangerous goods are safe to be handled or transported.

4.1.4 If a third party is used, appropriate measures shall be taken to ensure that all the requirements of this standard are met. The relevant consignor, train operator or consignee shall take full responsibility and accountability for the actions of the third party.

4.2 Training

The consignor, train operator and consignee shall ensure that their employees are appropriately trained, commensurate with their duties, to deal with the dangerous goods including:

- a) identification and classification;
- b) packaging requirements;
- c) labelling and marking;
- d) general hazards presented by the various classes of dangerous goods and their safe handling procedures;
- e) segregation of loads and compatibility;
- f) placarding;
- g) rolling stock suitability and service worthiness;
- h) loading and offloading;

- i) occurrence management including contingency planning and emergency preparedness;
- j) railway operators interfacing with train operators transporting dangerous goods;
- k) relevant documentation including a consignment note, wagon label, vehicle list and safety data sheets (SDS);
- l) wagon and consignment inspections during transit, and
- m) other (specify).

4.3 Consignor responsibilities

4.3.1 Classification and packaging

4.3.1.1 Classification

The consignor shall ensure that dangerous goods offered for transport are classified in accordance with SANS 10228. When the classification of a dangerous goods product is uncertain, the consignor shall provide the train operator with additional information in the form of an SDS and, if required, test results that support the assumed classification.

4.3.1.2 Packaging

The consignor shall ensure that dangerous goods offered for transport are packaged and labelled in accordance with SANS 10229-1 or SANS 10229-2, as relevant. Dangerous goods to be transported in IBCs shall comply with the requirements of SANS 10233.

4.3.2 Requirements for loading

The consignor shall ensure that:

- a) loading of dangerous goods shall only be undertaken by competent persons wearing appropriate personal protective equipment;
- b) the area is safe for the loading operations and where necessary barricades are erected and appropriate warning signs are clearly displayed in terms of the relevant national legislation (see foreword);
- c) the loading operation is conducted in a safe manner and is not placed at risk by other activities in the vicinity;
- d) the goods to be loaded are correctly classified, packaged and labelled;
- e) the packaging is not defective, damaged or unsafe;
- f) the wagons and containers are suitable for their intended purpose, including that they are clean and fit to load;
- g) the exempt quantity and compatibility requirements are adhered to;
- h) all wagons and containers are loaded in accordance with loading specifications and design requirements;
- i) where necessary, loads are properly segregated or separated according to the compatibility provisions in annex A;

- j) loads are properly secured and protected;
- k) the correct placard is displayed on the wagon or container;
- l) subject to the provisions in 4.1.3 in the event of a spillage during the loading or filling operation which results in the contamination of the wagon or container, such wagons and containers are cleaned before they are moved.
- m) compliance with any requirements given in SANS 10231 are adhered to; and
- n) the following requirements for loading in bulk shall be complied with:
 - 1) the wagons and containers designated for the specific dangerous goods are used;
 - 2) applicable testing dates for tanks, freight containers and IBCs have not expired;
 - 3) pressure vessels are in accordance with test requirements of local legislation;
 - 4) consignments are checked for leakages during and after loading or filling;
 - 5) after loading or filling no dangerous goods residue shall adhere to the outside of the wagons and containers; and
 - 6) before and after filling the tanks and pressure vessels with liquefied gas, the pressure gauges are checked as required in terms of the relevant national legislation (see foreword).

4.3.3 Waste classification confirmation

The consignor shall classify waste offered for transport that contains any material listed as dangerous goods in SANS 10228 and which exceeds the exempt quantity, as defined in SANS 10231, either by itself or a combination of other materials. Written proof of such classification shall be made available to the operator, and to the competent authority on request.

4.3.4 Precautions with respect to food products, for human consumption and animal feeds

4.3.4.1 The consignor shall ensure that food products and dangerous goods are not loaded together into the same wagon or container.

4.3.4.2 Food products shall not be loaded into a wagon or container that had previously carried dangerous goods until the wagon or container has been decontaminated and certified as such.

4.3.5 Loading of gas cylinders

The consignor shall ensure that:

- a) cylinders are appropriately secured to prevent the load from shifting;
- b) cylinders are loaded to stand vertically in a packing method described in SANS 10263-2; and
- c) gas containers with a maximum product capacity of 9 kg may be stacked vertically and not more than two cylinders high.

4.3.6 Documentation

4.3.6.1 Conditions of carriage

The consignor and the train operator shall agree on the conditions of carriage for the transport of dangerous goods.

4.3.6.2 Consignment note and wagon label (see annex B)

Prior to the transport of dangerous goods, the consignor shall hand over the consignment note and wagon label to the train operator. This shall contain at least the following information:

- a) the UN number;
- b) the proper shipping name;
- c) class of dangerous goods, and where applicable, the classification code as provided for in terms of the relevant national legislation for substances and articles of Class 1 (see foreword);
- d) where assigned, the packing group allocation;
- e) the quantity and a description of the load;

NOTE 1 An example of such a description is:

- (a) UN 1098;
- (b) ALLYL ALCOHOL;
- (c) 6.1;
- (d) 'I'; and
- (e) 25 drums,

which combined read as follows: UN 1098 ALLYL ALCOHOL 6.1 I 25 drums.

NOTE 2 The location, layout and order in which the elements of information required appear in the consignment note are optional, except that (a), (b), (c), (d) and (e) should be shown in sequence.

- f) with the exception of empty unclean containers, the total quantity of each type of dangerous goods bearing a different UN number, either as a volume or as a gross mass, or as a net mass as appropriate;
- g) the name and address of the consignor(s);
- h) the name and address of the consignee(s);
- i) a declaration by the consignor of any special arrangements required for the handling, packaging and transport of dangerous goods;
- j) goods packed in exempt quantities require no additional information. The term "EXEMPT QTY" shall be included in the vehicle list with the description of the dangerous goods being transported. In the event of more than one class compatible dangerous goods in excess of the exempt quantity being carried, the requirements of 5.3 shall apply;

- k) for empty uncleaned wagons which contain the residue of dangerous goods of classes other than Class 7 including empty uncleaned receptacles for gases with a capacity of not more than 1 000 L, the description on the consignment note shall be "EMPTY PACKAGING", "EMPTY RECEPTACLE", "EMPTY IBC", "EMPTY LARGE PACKAGING or EMPTY TANK WAGON", as appropriate, followed by the information of the dangerous goods last loaded;
- l) the consignor shall declare in writing that the contents of the consignment offered for transport are fully and accurately described by their proper shipping names, and that they are correctly classified, packaged and marked.
- m) the consignment note and wagon label are acceptable (see annex B); and
- n) the use of electronic data processing (EDP) or electronic data interchange (EDI) instead of paper documentation is permitted, provided that the data produced is at least equivalent to that of paper documentation.

4.3.7 Placarding

4.3.7.1 General

4.3.7.1.1 The consignor shall be responsible for placarding and shall ensure that placarding of the wagons or containers is at all times an accurate reflection of the dangerous goods to be transported.

4.3.7.1.2 Placards shall be clearly visible and legible.

4.3.7.1.3 Placards shall be designed and displayed in accordance with the requirements of SANS 10232-1. Dedicated wagons or containers may display placards in terms of:

- a) SANS 10232-1; or
- b) the appropriate hazard warning label and the UN number; or
- c) the appropriate hazard warning label and the shipping name.

For (b) and (c) above, the specification regarding size and colour shall be in accordance with SANS 10232-1.

4.3.7.1.4 The placards shall be affixed to the containment area of the wagons, tanks, pressure vessels, freight containers or IBCs. They may be fixed directly or supported by means of a permanently fixed frame.

4.3.7.1.5 The placarding affixed to a wagon or container containing dangerous goods of more than one class need not bear a subsidiary risk.

4.3.7.1.6 A wagon or container carrying dangerous goods of a single hazard class but of different response requirements in terms of the Emergency Response Guide (ERG) as described in SANS 10232-3 shall be placarded "MIXED LOAD" in the goods identification zone and the relevant hazard class diamond in the hazard class diamond zone of the placard.

4.3.7.1.7 A wagon and container transporting dangerous goods of a single hazard class and of the same response requirements contained in the ERG shall display the UN No. of the most hazardous substance in the dangerous goods identification zone and the hazard class diamond relevant to it in the hazard class diamond zone of the placard. Mixed loads of this nature shall be placarded as for single loads.

SANS 10405:2009

Edition 1

4.3.7.1.8 A wagon or container carrying dangerous goods of more than one compatible hazard class shall be placarded "MIXED LOAD" in the dangerous goods identification zone and "DANGEROUS" in the hazard class diamond zone.

4.3.7.1.9 Petroleum-based products such as diesel (UN 1202), petrol (UN 1203), kerosene (UN 1223) and aviation fuel (UN 1863) may be placarded with the generic UN No. 1203, either singularly or as a mixed load. Wagons or containers dedicated to any of these products shall use the appropriate UN Number.

4.3.7.2 Wagons

4.3.7.2.1 Placards shall be displayed on both sides of wagons.

4.3.7.2.2 Appropriate placards shall be displayed along each side at the position of the relevant compartments of multiple compartment tank wagons carrying two or more dangerous goods. Identical placards need only be displayed once along each side.

4.3.7.3 Freight and tank containers

4.3.7.3.1 Freight and tank containers shall carry placards.

4.3.7.3.2 Placards shall be displayed on both sides and on both ends of the freight container and tank-container.

4.3.7.3.3 Where the transport of freight containers includes a sea leg or movement across borders, split placards shall be displayed on such containers transported by rail. Split placards shall consist of a goods identification rectangle, the appropriate hazard class diamond and subsidiary risk diamond(s) where applicable, or a mixed load diamond.

4.3.7.3.4 Multiple compartment wagons, tanks, or freight containers carrying two or more compatible dangerous goods, shall be placarded with the appropriate placards along each side at the position of each compartment containing the relevant product and one placard for each product on both ends.

No additional placards are required for flat-bed wagons loaded with freight containers or tanks carrying dangerous goods.

4.3.7.4 Explosives (class 1)

4.3.7.4.1 Compatibility divisions shall not be indicated on placards if the wagon, tank, freight container and IBCs are carrying substances or articles belonging to two or more compatible groups. Wagons, tanks and freight container carrying substances or articles of different divisions shall bear placards conforming to the hazard class of the most dangerous division in the order 1.1 (most dangerous), 1.5, 1.2, 1.3, 1.6, 1.4 (least dangerous).

4.3.7.4.2 Wagons, tanks and freight containers carrying 1.5 D substances or articles of division 1.2, shall be placarded as Division 1.1.

4.3.7.5 Fumigated wagons

4.3.7.5.1 The transport of wagons, tanks and freight containers which have been fumigated shall display UN No. 3359 and the consignment note shall show the date of fumigation and the type and amount of the fumigant used. In addition, instructions for disposal of any residual fumigant including fumigation devices (if used) shall be provided.

4.3.7.5.2 A warning sign as specified in annex D shall be placed at the point of entry on each fumigated wagon, tank and freight container in a location where it will be easily seen.

4.4 The train operator

The train operator shall, as a minimum, ensure the following:

- a) The rolling stock or containers supplied to the consignor for loading:
 - 1) are suitable for the product to be transported;
 - 2) are in a serviceworthy condition; and
 - 3) include instructions for loading.
- b) Dangerous goods accepted for transport comply with the following requirements:
 - 1) the consignment note and wagon label as declared by the consignor in accordance with 4.4(f) accurately reflect the dangerous goods to be transported and shall be displayed on each wagon;
 - 2) establish with reference to 4.3.2(h), that the wagons or containers have not been overloaded or over filled and where required, the load is appropriately secured and covered,
 - 3) placards are correctly displayed in accordance with 4.3.7; and
 - 4) the wagons or containers are free from any visible dangerous goods spillage that could have a detrimental effect on people, property, the wagon or container, the remainder of the consignment, or the environment.
- c) Shunting and marshalling are done in accordance with the following:
 - 1) rail wagons containing dangerous goods shall be shunted, marshalled or coupled with caution;
 - 2) wagons containing explosives shall be marshalled as near to the locomotive of the train as possible; and
 - 3) wagons containing explosives may not be marshalled near other wagons containing dangerous goods.
- d) Prior to departure, the following dispatch requirements are complied with:
 - 1) where more than one class of dangerous goods (mixed load) is transported the load shall conform to the requirements shown in the load compatibility chart (see annex A). The wagons and containers shall be separated by a minimum distance of 18 m from wagons and containers carrying non-compatible dangerous goods.
 - 2) wagons carrying dangerous goods shall be separated from the locomotive by at least 18 m. One wagon containing general freight shall be placed at the end of the train.
 - 3) for transport of explosives, wagons or containers loaded with explosives shall comply with the requirements of the relevant national legislation (see foreword);
 - 4) the vehicle list shall accurately reflect the dangerous goods to be transported; and

SANS 10405:2009

Edition 1

- 5) wagons or containers that have transported dangerous goods shall retain their placards until they have been cleaned, degassed or decontaminated and certified clean.

NOTE Empty unclean gas wagons or containers should be treated as if they are full until certified clean and gas-free.

- e) In-transit monitoring is undertaken, thus, regular checks are made during transit to ensure the continued service worthiness of wagons or containers and where possible, the integrity of the load. If during transit, non-compliance or an unsafe condition is observed which could either jeopardize the safety of train operations or impact on the environment, the train shall be stopped, and may only continue when the non-compliance or unsafe condition has been rectified and it is safe to proceed.
- f) Contingency planning and occurrence reporting are done in accordance with the following:
 - 1) the train operator shall have contingency plans in place in accordance with the requirements of the SANS 3000-1;
 - 2) the train operator shall have 24 h contact numbers for receiving and providing information on the transport of dangerous goods and shall communicate the numbers to relevant personnel, emergency services and other operators along the routes on which dangerous goods are transported;
 - 3) the train operator shall at least annually review or whenever there is a significant change in the classes and quantities of dangerous goods intended to be transported, and inform the emergency services along each route; and
 - 4) the train operator shall report occurrences in terms of the requirements of SANS 3000-1.

4.5 Consignee

The consignee shall:

- a) be responsible for the offloading of dangerous goods unless otherwise agreed;
- b) verify that the dangerous goods being received are in accordance with the consignment note and wagon label;
- c) verify that the consignment is not damaged and there is no obvious spillage. If there is evidence of spillage or damage that would adversely impact on human health, the environment or the wagon, the consignee shall inform the train operator and, where appropriate, consult with the emergency services, the consignor and the competent authority to decide on actions to be taken. Wagons and containers shall be examined for possible contamination. Where required the consignment shall be secured and placed in a safe location pending a decision regarding the offloading;
- d) ensure that the offloading operations are carried out by personnel trained in the relevant procedures;
- e) ensure that all the necessary equipment for the safe offloading of the dangerous goods equipment is in proper working order;
- f) ensure that where the wagon or container cannot be certified as clean, that appropriate wagon labels are affixed to the wagon and placards shall not be removed from the container; and

- g) in the case of bulk deliveries, in addition to the requirements above in 4.5.1(a) to 4.5.1(f) ensure that:
- 1) there is sufficient space in the tanks or bins into which the consignment is to be off-loaded and that such tanks and bins are in a fit condition to receive the consignment;
 - 2) the valves and hatches can be closed immediately in case of leakage or any other emergency;
 - 3) after off-loading, the wagon is free from spillage and that all valves and hatches are closed;
 - 4) in the case of delivery of a part load, the remaining consignment is properly secured;
 - 5) minimum residue remains in the wagon or container; and
 - 6) the operator is informed of any consignment or part thereof that has not been offloaded.

5 Design requirements, security and exemptions

5.1 Design requirements

5.1.1 General

The train operator shall ensure that wagons used to transport dangerous goods comply with the design requirements of the relevant national legislation (see foreword) and in accordance with SANS 3000-1, SANS 3000-2-1 and SANS 3000-2-3.

5.1.2 Vessels under pressure

5.1.2.1 Design of new tank wagons

5.1.2.1.1 Tank wagons shall be designed according to internationally recognized wagon design standards/codes including:

- a) AAR or;
- b) UIC.

NOTE Any wagons designed should comply with the interoperability and compatibility requirements as described in SANS 3000-1, SANS 3000-2-1 and SANS 3000-2-3.

5.1.2.1.2 Tank wagons may also be designed according to any of the approved standards/codes for the design of vessels as listed in the Regulations for vessels under pressure in the relevant national legislation (see foreword) subject to the following additional requirements to address train dynamics:

- a) the dynamic loads imposed on the pressure vessel and its supports and fittings;
- b) stability of the wagon; and
- c) the protection of shells and fittings in the case of an accident.

NOTE Requirements in respect of (a), (b) and (c) above are published in internationally recognized wagon design standards including those of the AAR and the UIC.

5.1.2.2 Existing wagons

5.1.2.2.1 Where existing wagons do not strictly comply with the requirements of clause 5.1.2.1, sound engineering practice shall be applied to validate and verify the integrity of the wagons for continued or extended use to the satisfaction of an Approved Inspection Authority (AIA).

5.1.2.2.2 The continued or extended use of tank wagons shall be formalized by a certificate of continuance issued by an AIA.

5.1.3 Non-pressurised tank wagons and general freight wagons

The design of all other rolling stock used to convey dangerous goods on an ad hoc or permanent basis shall be in accordance with internationally recognized wagon design standards or codes including those of the AAR and UIC.

5.2 Security

5.2.1 The train operator shall ensure compliance with the relevant national legislation (see foreword) regarding security issues.

5.2.2 The train operator shall ensure that:

- a) Personnel are adequately trained to deal with security issues.
- b) High consequence dangerous goods as declared in the relevant national legislation (see foreword), shall be recognized and special attention shall be given to ensure safe transport.
- c) Security plans shall be developed and implemented when necessary, including:
 - 1) specific allocation of responsibilities to competent personnel with appropriate authority;
 - 2) recording of dangerous goods transported;
 - 3) review of current operations and assessment of security risks including
 - stops en route,
 - storage of dangerous goods in wagons for long periods,
 - delays in en route, and
 - operating practices;
 - 4) effective up to date procedures for reporting incidents, threats or breaches of security;
 - 5) procedures for evaluating and testing of security plans;
 - 6) measures to secure certain information;
 - 7) communication plans; and
 - 8) measures and procedures to prevent and identify losses and theft.

5.2.3 In addition, the train operator shall ensure compliance with the particular requirements given in SANS 3000-1.

5.3 Exemptions

5.3.1 General

The provisions laid down in this standard do not apply to:

- a) Dangerous goods carried by a passenger where the goods in question are packaged for retail sale and are intended for personal, domestic, leisure or sporting activities; or

NOTE Dangerous goods packed in IBCs, large packaging or tanks should not be considered to be packaged for retail sale.

- b) Gases and liquid fuels contained in tanks affixed to vehicles and equipment intended for its operation, subject to the fuel cock between the gas tank and the engine being closed and the electric contact open, where applicable.

5.3.2 Exempt quantities

5.3.2.1 The requirements of this standard do not apply to items with the same UN number if the total quantity transported is less than the quantity (in kilograms or litres, as appropriate) indicated in exempt quantity list in SANS 10231.

5.3.2.2 For a mixed load, if no single item of dangerous goods in the load exceeds the quantity (in kilograms or litres, as appropriate) given in SANS 10231, the following calculation shall be done for each item of dangerous goods in the load to determine if the total exceeds 1 000 kg or 1 000 L as calculated below.

$$A = Q \times F$$

where

A is the mass or volume of exempted quantity in kilograms or litres, as applicable;

Q is the quantity of the dangerous goods being transported, in kilograms or litres, as applicable;

F is the factor shown in exempt quantity list in SANS 10231.

If the sum of *A* for all the calculations does not exceed 1 000 kg or 1 000 L, the requirements of this standard do not apply.

Annex A

(normative)

General provisions and load compatibility chart for dangerous goods

A.1 General

A.1.1 The requirements in force at the dispatching station shall be complied with for the loading of goods, unless any special requirements are prescribed in this annex for certain substances.

A.1.2 Packages shall be so loaded in wagons that they cannot shift dangerously, overturn or fall.

A.1.3 The interior and exterior of a wagon or container shall be inspected prior to loading to ensure that there is no damage that could affect its integrity or that of the packages to be loaded into it.

A.2 Mixed loading prohibition

A.2.1 Packages bearing different danger labels shall not be loaded together in the same wagon or container unless mixed loading is permitted according to table A.1 based on the danger labels they bear.

A.2.2 The mixed loading prohibitions for packages shall also apply to the loading of packaged and small containers and the mixed loading of small containers in a wagon or large container in which small containers are carried.

Table A.1 — Dangerous goods load compatibility chart

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Class or Division	1	1.4	1.5	1.6	2.1, 2.2, 2.3	3	4.1	4.1 +1 *	4.2	4.3	5.1	5.2	5.2 +1 *	6.1	6.2	7	8	9
1	See A.3.1										(d)							(b)
1.4					(a)	(a)	(a)		(a)	(a)	(a)	(a)		(a)	(a)	(a)	(a)	(a); (b); (c)
1.5																		(b)
1.6																		(b)
2.1, 2.2, 2.3		(a)			x	x	x		x	x	x	x		x	x	x	x	x
3		(a)			x	x	x		x	x	x	x		x	x	x	x	x
4.1		(a)			x	x	x		x	x	x	x		x	x	x	x	x
4.1 + 1*								x										
4.2		(a)			x	x	x		x	x	x	x		x	x	x	x	x
4.3		(a)			x	x	x		x	x	x	x		x	x	x	x	x
5.1	(d)	(a)			x	x	x		x	x	x	x		x	x	x	x	x
5.2		(a)			x	x	x		x	x	x	x		x	x	x	x	x
5.2 + 1*													x					
6.1		(a)			x	x	x		x	x	x	x		x	x	x	x	x
6.2		(a)			x	x	x		x	x	x	x		x	x	x	x	x
7		(a)			x	x	x		x	x	x	x		x	x	x	x	x
8		(a)			x	x	x		x	x	x	x		x	x	x	x	x
9	(b)	(a),(b), (c)	(b)	(b)	x	x	x		x	x	x	x		x	x	x	x	x

X Mixed loading permitted.

NOTE 1 (a) denotes that mixed loading permitted with 1.4S substances and articles.

NOTE 2 (b) denotes that mixed loading permitted between goods of class 1 and life-saving appliances of class 9 (UN Nos. 2990, 3072 and 3268).

NOTE 3 (c) denotes that mixed loading permitted between air bag inflators, or air bag modules, or seat-belt pretensioners of division 1.4, compatibility group G, (UN No. 0503) and air bag inflators or air modules or seat-belt pretensioners of class 9 (UN No. 3268).

NOTE 4 (d) denotes that mixed loading permitted between blasting explosives (except UN No. 0083 explosive, blasting, type C) and ammonium nitrate and inorganic nitrates of class 5.1 (UN Nos. 1942 and 2067) provided the aggregate is treated as blasting explosive under class 1 for the purposes of placarding, segregation, stowage and maximum permissible load.

NOTE 5 In 4.1+1 and 5.2+1 the +1 denotes the explosive subsidiary risk.

A.3 General provisions for explosives

A.3.1 Packages containing substances or articles of class 1, bearing a label conforming to models Nos 1,14,1.5 or 1.6 which are assigned to different compatibility groups shall not be loaded together in the same wagon or container, unless mixed loading is permitted in accordance with table A.2 for corresponding compatibility groups.

A.3.2 Protective distance for every wagon or container containing substances or articles of class 1 and bearing a label conforming to models Nos 1, 1.5 or 1,6 shall be separated in the direction of the track from wagons or large containers bearing a label conforming to model Nos 2.1, 3, 4.1, 4.2, 4.3, 5.1 or 5.2 by a protective distance.

The requirement for this protective distance is met if, from the end of the buffer head or end wall of the large container, the minimum distance is 18 m.

Table A.2 — Compatibility requirements for explosives

1	2	3	4	5	6	7	8	9	10	11	12
Compatibility group	B	C	D	E	F	G	H	J	L	N	S
B	x		(a)								x
C		x	x	x		x				(b), (c)	x
D	(a)	x	x	x		x				(b), (c)	x
E		x	x	x		x				(b), (c)	x
F					x						x
G		x	x	x		x					x
H							x				x
J								x			x
L									(d)		
N		(b),(c)	(b),(c)	(b),(c)						(b)	x
S	x	x	x	x	x	x	x	x		x	x

X Mixed loading permitted.

NOTE 1 (a) denotes that packages containing articles of compatibility group B and those containing substances or articles of compatibility group D may be loaded together in one wagon or in one container provided they are effectively segregated in such a way that there is no danger of transmission of detonation from the articles of compatibility group B to the substances or articles of compatibility group D. Segregation should be achieved by using separate compartments or by placing one of the two types of explosive in a special containment system. Either method of segregation should be approved by the competent authority.

NOTE 2 (b) denotes that different types of articles of division 1.6, compatibility group N, may be carried together as articles of division 1.6, compatibility group N, only when it is proven by testing or analogy that there is no additional risk of sympathetic detonation between the articles. Otherwise they should be treated as hazard division 1.1.

NOTE 3 (c) denotes that when articles of compatibility group N are carried with substances or articles of compatibility groups C, D or E, the articles of compatibility group N should be considered as having the characteristics of compatibility group D.

NOTE 4 (d) denotes that packages containing substances and articles of compatibility group L may be loaded together in one wagon or container containing the same type of substances and articles of that compatibility group.

Annex B

(informative)

Consignment note and wagon label

COMBINED CONSIGNMENT NOTE AND WAGON LABEL – DANGEROUS GOODS									
Account Number		CONSIGNMENT NUMBER							
Client Reference (1)		Client Reference (2)		Date					
Forward Location				Receiving Location					
Siding Number		Via		Siding number					
Sender		Consignee							
Address		Address							
Signature of sender		Wagon Number							
Description of Contents		Quantity			Mass Measure*	Yes	No		
		Quantity			Gross				
		Quantity			Tare				
Vessel name/ number		Permit Number			Nett				
Tarp number	Slug number	Ullage		Temp	Density				
Seal number				Commodity Code		Zoning Code			
UN Number	Class	Insurance*							
Packing Group	Flash point	Yes	No						
*: mark your choice.									
CONDITIONS									
<p>I hereby declare that the contents of this consignment are fully and accurately described by the proper shipping name, and are classified, packed, marked, labelled or placarded, and loaded according to the required profile and are in all respects in proper condition for transport according to applicable international and national governmental regulations.</p> <p>NAME: _____ SIGNATURE _____ DATE _____</p>									
RECEIPT OF CONSIGNMENT/WAGONS									
SIGNATURE OF CONSIGNEE: _____ DATE: _____									
REMARKS: _____									

Annex C

(informative)

Vehicle list

For the purpose of providing emergency information on dangerous goods that are transported by rail, a vehicle list should contain at least the following information. The format is not prescribed.

VEHICLE LIST

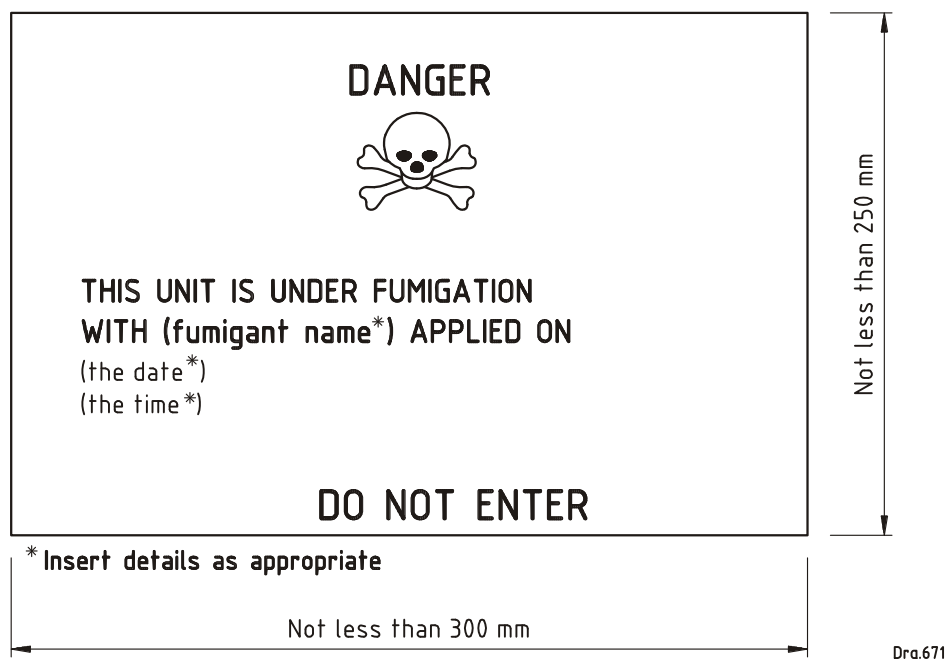
		Train No.:			Date:			
		From:						
		To:						
		Driver's name:			Assistant's name(s):			
		Departure date/time:						
		Scheduled arrival date/time:						
Wagon No.	Container No.	Destination	Gross Mass	Load Date	UN No.	Class	Packaging Group	Product Description

Annex D

(normative)

Fumigation warning signs

The fumigation warning sign shall be rectangular and shall not be less than 300 mm wide and not less than 250 mm high. The markings shall be black print on a white background with lettering not less than 25 mm high. This sign is illustrated in figure D.1.

**Figure D.1 — Fumigation warning sign**

Bibliography

Standards

ISO 1496-1, *Series 1 freight containers – Specification and testing – Part 1: General consignment containers for general purposes.*

ISO 1496-2, *Series 1 freight containers – Specification and testing – Part 2: Thermal containers.*

ISO 1496-3, *Series 1 freight containers – Specification and testing – Part 3: Tank containers for liquids, gasses and pressurized dry bulk.*

ISO 1496-4, *Series 1 freight containers – Specification and testing – Part 4: Non-pressurised containers for dry bulk.*

ISO 1496-5, *Series 1 freight containers – Specification and testing – Part 5: Platform and platform-based containers.*

ISO 8323, *Freight containers – Air/surface (intermodal) General purpose containers – Specification and tests.*

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European Union. Regulations concerning the international carriage of dangerous goods by rail (RID).

HMSO, 1993.

ICAO Technical Instructions.

International maritime dangerous goods code. London: IMO, 1994.

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